



**You say you're looking for a red-hot sport aerobic machine, one that can do it all, including knife-edge loops? Look no further! You'll find all the performance you can handle and then some in Tyrone Parker's...**

Right: The latest variant of the "Knife," with the deepened fuselage and tapered wing. This is the version detailed on the plans. Power can be anything in the .19 to .25 range. Note the subtle differences between this and the earlier "Knife" shown at the top of the page, which sports a constant chord wing and shallower fuselage.

**KNIFE**

• If you're interested in dampening the verbose a bit or just want to have a good time and make the other fellows jealous... this is the machine that is capable.

The vertical winglets above and below the C.G. (disguised as a canopy and an air scoop) enable this plane to effortlessly sustain knife-edge flight and perform the legendary knife-edge loop with ease. The disguised winglets also keep it up on axis as it rolls. It will flat turn 'round and 'round like a control liner... flat spin upright or inverted, and snap and tumble (lomcevak) like crazy. Keep it light... install a suitable engine (Fox .19 BB, Picco .21, and Super-Tigre .25 recommended) and it's guaranteed to blow the balsa dust out of your brain.

With the exception of wire-to-wood, where I use five-minute epoxy, cyanoacrylate adhesives are used. Regular CA to tack things together, followed by a coat of thin CA.

Begin construction with the wing. Cut spar halves from tough, springy 1/8-inch balsa and join with CA. Cut joiners from similar 1/16 stock, taper ends as shown on plan and CA to spar center section. Drill 7/64-inch I.D. control cable housing holes. Measure and mark rib locations. Cut light 1 x 1/4-inch trailing edge to fit as shown on plan and join with CA. CA 1/8-inch balsa joiner to T.E. Mark rib locations on T.E. Bevel sub-trailing edge so that it's 3/8 at

the front surface and 1/4 at the aft surface. Trim ends as shown and mark rib locations. Cut sub-leading edge from 1/8 balsa and mark rib locations. Cut leading edge halves from 1/4-inch balsa. Cut W-1 ribs from 1/8 balsa and remaining ribs from 1/16 balsa as shown. Drill control cable housing holes in ribs W-1 through W-4.

Glue aft halves of W-1 and W-4 to back of spar, taking care to keep them square. Glue trailing edge in place keeping it parallel with spar center and square. Add W-2 and W-3. CA W-7 to spar and add sub-trailing edge. Add W-5 and W-6 and 1/8-inch balsa brace at aft W-4. CA forward sections of W-1 and W-7 to front of spar and add sub-leading edge. CA forward W-2 through W-6 in place. Cut ends of 1-1/4 inch wide 1/16 balsa to fit around T.E. joiner as shown and CA in place. Cut out at aileron wells. CA 1-inch wide 1/16 balsa leading edge sheeting in place. CA remaining center section sheeting between W-1 and W-2 in place. Add 1/16 x 3/16-inch cap strips over ribs and 1/16 balsa fillets at inside corners. CA leading edge in place, trim, carve to shape, and sand. Cut ailerons from light 1-1/2 x 3/8-inch T.E. stock as shown. Sand front of tip section square and CA to sub-T.E. at tip. Bevel front of ailerons as shown on plan detail and check for nice fit in wells. Drill control horn mount holes. Add 1/4-inch light balsa wing tips then sand finished wing completely smooth. I've

enjoyed good results by shaping lightly with #80 sandpaper, smoothing with #220 and polishing with #600.

Cut fuselage sides from light 3/16 balsa. Trim wing openings to fit. This is one of the most tedious parts of the entire project but get them close so you won't need any excess glue or filler (and weight). When satisfied, slide sides back off wing and mark landing gear mount position inside sides. CA 1/2-inch balsa triangle longerons in place from back of L.G. mount aft and from front of L.G. mount forward. If you've failed to select light enough stock you'll probably have to soak the triangles in ammonia, bend them and pin them to a board to dry somewhere before you can make the curve at the fuselage front. Using light triangular stock, or the old soak and dry technique, CA the top longerons in place.

Sand outside fuselage sides smooth, slide back onto wing and CA in place. Bevel aft fuselage insides. Using a couple of three or four inch long trailing edge scraps as a clamp, squeeze the aft fuselage ends together. Slide the ends to and fro as necessary to get even curves on both sides... check the vertical and tack with CA. Check again and secure with CA. Sand fuselage top and bottom using sanding block to reach both sides and straight edge to get things level and square. Cut F-4 sides to fit from 1/8 x 1/4 balsa and CA in place. Cut cross pieces to fit and CA in place.

Bend landing gear to shape from 1/8 music wire. Cut L.G. core from 1/8 hard balsa. Cut front and back plates from 3/32 aircraft ply. Squeeze plates to core and see if gear will fit in slot. If your core is a bit thinner than the gear add a 1/64-inch core plate then sand the balsa side to get a snug fit. Front and back plates should protrude about 1/32 below the gear. CA plates to core but don't glue wire in at this time. Set mount in place between slots in bottom fuselage longerons. Mount should protrude 1/8 inch from bottom to fit flush when bottom sheeting is applied. Use 1/8 inch scrap to check. Slip gear in to check alignment tack mount with... remove gear and secure mount with CA. Cut 3/8 triangle balsa braces to fit and CA in at mount corners.

Cut firewall core from 1/8 lite-ply and front and back plates from 1/16 aircraft ply. Laminate with CA. Bevel top and bottom and trim to fit inside fuselage. Attach the engine you have selected to its mount and attach spinner backplate. Measure from back of backplate to back of mount so you get the firewall in the right position relative to the front of the plane. Mark firewall position inside fuselage and remove firewall. Take your engine with muffler attached hold it up to fuselage front... sight back and determine how much it needs to be rotated upward for the muffler to clear the fuselage side. Keep in mind that the fuselage will be rounded back into the longeron. When you have made your decision, transfer your mount bolt hole positions to the firewall. I drill 1/16-inch holes... tap them with a #4 socket head screw... saturate the holes with thin CA and secure the mount with #4 x 3/4 inch

socket head screws. This method is light, convenient and I've had no trouble with them coming loose. If you prefer blind nuts, install them . . . drill your pressure and fuel line holes and drill your throttle cable hole to suit your engine. Set firewall back in place and squeeze fuselage sides firmly but gently to hold in place while you check alignment. Hold a straight edge vertically up against it and look at it from the side to get it straight up and down. Look down from the top to get it straight across. Tack firewall in place with CA . . . check alignment again then secure with CA. Trim 3/8 balsa triangles to fit and CA into back corners. Re-drill your throttle cable housing hole on through the triangle you have just glued in. Cut F-1 from 1/8-inch lite-ply and, being careful to keep it square vertically and across, CA in place.

Glue on bottom 1/8-inch sheeting from tail to about an inch in front of the tailwheel bracket position. Glue on top sheeting from tail to about an inch in front of fin leading edge position. Trim and sand flush with fuselage sides. Slot bottom for tailwheel bracket. Try to get it really tight. Tack CA a scrap of 3/16 x 1/4 balsa where your fin is going to be and another to the tail where your rudder is going to be. Now you can begin carving and sanding the fuselage corners. Doing so before the sheeting is applied saves a lot of glue and makes it easier to see what's going on. Carve and sand carefully up to the scraps tacked on at the tail and you'll have a nice fit when you later glue the fin-rudder in place. Carve and sand toward the front, leaving about a 1/4 inch of the longerons. When you've got it rounded, smooth and even, check the position of the hatch front and cut a section of sheeting apart at the angle of the hatch line. Glue these pieces to the fuselage top but not to each other so you can get a razor blade between them later to finish the hatch cut. Glue sheeting fore and aft of the rear hatch line, again gluing against but not to each other. Glue rest of top sheeting in place, trim and sand smooth. Sheet bottom from L.G. mount aft and forward. Trim and sand smooth.

Mark hatch cut-out with straight edge and pencil. Complete front and back cuts with razor blade and cut along sides with straight edge and a #11 model knife. Lift hatch carefully, cutting fibers loose here and there as necessary until it lifts free. Sand lightly. Cut hatch tongue a bit oversize from 1/32 ply and trim to fit tight up into fuselage. Coat this area of fuselage with CA and glue tongue into hatch. Trim aft hatch former to fit and CA in place. Cut F-3 to fit from 1/8 balsa and set aside. Cut hatch hold-down plate top from 1/8 lite-ply and bottom from 1/16 aircraft ply. Laminate with CA. CA hold-down plate up under fuselage top sheeting. Notch F-3 to fit and CA in place. Cut front hatch former from 1/8 balsa, CA in place then notch to fit snugly around hold-down plate.

Wrap cloth surgical tape around hatch front as shown on plan and saturate with thin CA to prevent hold-down screw from tearing through. When dry, set hatch in place, then drill and install the #2 x 1/2 inch hold-down screw (with washer). Sand

hatch-fuselage area to smooth even fit. Cut canopy from light 3/16 balsa, trim to fit, trace base outline onto hatch top, and set aside. Remove hatch and set aside. Cut out sub-leading edge and back of trailing edge inside fuselage as shown on plan.

Cut out right front of fuselage to fit your engine. If you use a Picco .21, you'll need to cut out the right side of F-1 to clear the carb. When you get enough room, install engine, trim to final fit, then remove engine. Cut drain slot in bottom as shown on plan, then give all engine compartment seams a coat of thin CA.

Cut fin and rudder from light 3/16 sheet balsa. Tack glue together, razor-plane and sand taper to top (about 1/16), round leading edge, taper from seam to trailing edge, finish sand, separate, bevel rudder front, drill and notch for tailwheel wire, drill control horn mount holes, wrap control horn area with cloth surgical tape, saturate with CA, and set aside.

Cut stabilizer and elevator halves from light 3/16 balsa. CA elevator halves to 1/4 x 3/16 spruce joiner and tack elevator to stab. Razor-plane and sand taper to tips (about 1/16), round leading edge, taper from hinge line to trailing edge (about 1/16), finish sand, separate, bevel front of elevator, drill control horn mount holes, tape elevator to stab and slide stab into fuselage slot.

Hold elevator control horn in place and mark elevator control cable housing exit for smooth line from fuselage to horn. Remove and use similar procedure to determine and mark rudder control cable housing exit. Drill both exits.

Wrap tail wheel bracket area with cloth surgical tape and saturate with CA. Bent bottom part of 1/16 music wire to fit around tail wheel. Solder inside wheel washer, slide wheel on, trim axle to fit and solder outside washer. Solder inside main gear wheel washers, slip wheels on, trim axles and solder outside washers. Slip tail wheel bracket bearing washer onto tail gear, bend wheel end of gear back, slip bracket on, bend top of gear back and trim end as shown on plan. Set both gear aside.

Install servo mounts as shown on plan, trimming and adjusting to fit servos used. I laminate my 1/8 ply from two layers of 1/16 ply so I can cut the parts out with a model knife.

Cut air scoop from 3/16 light balsa, trim to fit, trace position outline onto fuselage and set aside.

I cover everything except wing panels with Peck-Polymers domestic tissue (fuselage, hatch, canopy, scoop, fin, rudder, stab, elevator, ailerons, and wing center section, leaving a 1/2-inch strip just inside W-2). Brush on a coat of Balsarite and smooth the tissue on immediately. It shrinks up nicely as it dries. As each component is covered, I give it a coat of 40-60 Sig Lite-coat clear dope and thinner. Trim tissue from canopy base on hatch and, aligning carefully, CA canopy in place. Trim tissue from scoop base on fuselage bottom and, aligning carefully, CA scoop in place. Trim tissue from fin base area on fuselage and, aligning carefully, CA fin to fuselage. Trim tissue from stab where it fits to fuse-

lage, slide stab into place, align carefully, and saturate seam with thin CA. Give all components two more coats of Lite-coat, smoothing between coats with #600 sandpaper.

Hinge elevator to stab with E-Z hinges. Cut an end of a 1/16 x 1/8 scrap stick of balsa at about a 45° angle and use the wedge end to dip into the CA bottle and touch the hinges. If you try to drop it right out of the bottle it will run through and onto your covering on the opposite side, no matter how careful you are. CA tailwheel bracket in place. Fit hinges into rudder, slot fin to receive rudder, slit paper at tail gear wire position on rudder, apply five-minute epoxy to slot and to wire end, slide rudder into place and when epoxy is dry, CA hinges.

Slide elevator and rudder control cable housings into place and CA at exits. Install braces at F-4. It's kind of a long reach back in there through the hatch opening, so you might want to skewer them on a model knife to set them in place. Install aileron control cable housings in wings. I cover my wing panels with translucent Micafilm. It requires a bit of extra care, but it's light, tough, and beautiful. Using Balsarite and low heat as per instructions, I cover the tops, wrap all around and trim back to about 1/8 inch all around underneath. Cut aileron control cable housing holes in bottom film panels. Balsarite wing frame bottom, iron on film and trim all around right on the edge. Run a bead of CA all around the seam, then, taking care not to get it too hot, shrink film. Hinge ailerons. Epoxy main gear in place. Apply trim and decals as desired and spray over everything with a couple of coats of clear polyurethane. Let dry thoroughly.

Install throttle cable housing. Secure to fuselage side where necessary with cloth surgical tape and CA. Attach rudder control horn and trim bolt ends. Attach elevator control horn and trim bolt ends. Attach aileron control horns and trim bolt ends. Thread clevises on to couplers and attach clevises (or clevi as the case may be) to control horns.

Install receiver battery pack and receiver (both well wrapped with foam). Install charge receptacle and switch harness. Install engine. Make up throttle, elevator, and rudder control cables as shown on plan detail. Turn your radio on and center your servo arms. Install elevator and rudder cables. Install front cable housing clamps, adjusting as necessary to get a smooth run to servo arms. Thread aileron cable into place. Secure E-Z connector screw with thread-lock. Install throttle cable. Level control surfaces. Trim and solder cable ends to couplers. Solder tailwheel bracket bearing up against bottom of bracket. (Use paste soldering flux for best results when soldering cables and wire.) Install tank, spinner backplate, balanced 9x4 or 9x6 propeller and spinner. Check all controls for proper direction and smoothness, secure hatch, and head for the field.

Exercise the customary caution, keep the elevator throw low till you get used to it, then have fun. . . .

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